FIRST YEAR OF BACHELOR OF SCIENCE MINOR PHYSICS REVISED SYLLABUS ACCORDING TO CBCS NEP2020

COURSE TITLE: GRAPHICS USING COMPUTER
SEMESTER-II
W.E.F. 2023-2024

RECOMMENDED BY THE BOARD OF STUDIES IN PHYSICS
AND
APPROVED BY THE ACADEMIC COUNCIL

Devrukh Shikshan Prasarak Mandal's
Nya. Tatyasaheb Athalye Arts, Ved. S. R. Sapre Commerce, and Vid. Dadasaheb Pitre Science College (Autonomous), Devrukh. Tal.Sangmeshwar, Dist. Ratnagiri-415804, Maharashtra, India

Academic Council Item No: **03 dated 8 July 2023**

Name of the Implementing Institute	:	Nya. Tatyasaheb Athalye Arts, Ved. S. R. Sapre Commerce, and Vid. Dadasaheb Pitre Science College (Autonomous), Devrukh. Tal. Sangmeshwar, Dist. Ratnagiri-415804,
Name of the Parent University	:	University of Mumbai
Name of the Programme	:	Bachelor of Science
Name of the Department	:	Physics
Name of the Class	:	First Year
Semester	:	Second
Paper	:	I
No. of Credits	:	02
Title of the Course	:	Graphics using Computer
Course Code	:	S109PHT
Name of the Vertical in adherence to NEP 2020	:	Minor
Eligibility for Admission	:	Any 12^{th} Pass seeking Admission to Degree Programme in adherence to Rules and Regulations of the University of Mumbai and Government of Maharashtra
Passing Marks	:	40%
Mode of Assessment	:	Formative and Summative
Level	:	UG
Pattern of Marks Distribution for SEE and CIA	:	60:40
Status	:	NEP-CBCS
To be implemented from Academic Year	:	2023-2024
Ordinances /Regulations (if any)		

Syllabus for First Year of Bachelor of Science

(With effect from the academic year 2023-2024)

SEMESTER-II **Paper No.– Minor(CS) – I**

Course Title: Graphics using computers **No. of Credits - 02**

Type of Vertical: Minor **COURSE CODE: S109PHT**

Learning Outcomes Based on BLOOM's Taxonomy:

After completing the course, the learner will be able to…

Course Learning Outcome No.	Blooms Taxonomy	Course Learning Outcome
CLO-01	Remember	Know the structure of graphics systems
CLO-02	Understand	Understand the rendering of pixels, shapes etc
CLO-03	Apply	Use various algorithms to draw the intended graphic figures
CLO-04	Analyze	Perform object rendering
CLO-05	Evaluate	Work out various curves as needed
CLO-06	Create	Animate various graphics objects

Syllabus for First Year of Bachelor of Science

(With effect from the academic year 2023-2024)

SEMESTER-II **Paper No.– Minor(CS) – I**

Course Title: Graphics using computers **No. of Credits - 02**

Type of Vertical: Minor **COURSE CODE: S109PHT**

COURSE CONTENT			
Module	**Content**	**Credits**	**No. of Lectures**
1	**Introduction to Computer Graphics** Introduction to Computer graphics and its applications, Elements of graphics Displays. **Scan Conversion of lines:** Digital Differential Analyzer(DDA) algorithm, Bresenham Line drawing algorithm **Scan Conversion of a circle:** Bresenhams‟ method of Circle drawing, Midpoint Circle Algorithm, Midpoint Ellipse Algorithm. **Introduction to Computer Graphics libraries in C.** **Design and Visualization** **Viewing and Clipping** Introduction to Viewing and Clipping, Window to viewport mapping, **2D Clipping system:**Point clipping, Inside-Outside Test Introduction to Line Clipping- Mid-Point Subdivision Clipping Algorithm, Cohen-Sutherland Clipping algorithm. **Polygon Clipping:** Sutherland-Hodgeman Algorithm. Character Clipping **Curves and Object design** Introduction to Modelling of object primitives, Space Curve representation Cubic Splines, Bezier curves, Properties of Bezier curves, B-Spline curves, comparison of Bezier curves and B-Spline curves **Surface Generation and Object Design:** Wire frame model, Surface of Revolution, Sweep surface design, Quadric Curved surfaces.	01	15
2	**Advanced Computer Graphics** **Object Rendering** Visible and Hidden Surfaces: Introduction to hidden	01	15

	lines and surfaces, Image and Object space algorithm, Floating Horizon Algorithm, Painters algorithm, Z-Buffer algorithm **Object Rendering Models:** Introduction to object rendering, Illumination Model, **Shading Techniques:** Gouraund Shading, Phong Shading. Transparency effect, Introduction to shadows, Texture mapping **Animation and Virtual Reality** Animation and Virtual reality: Introduction to Computer Animation and Multimedia systems: Components of Animation system, Keyframing, Kinematics and Inverse Kinematics, Introduction to Morphing Introduction to Virtual Reality and Special Effects		
	Total	02	30

Note:- The introductory and practical oriented portion of most of the topics will be taught in flipped classroom mode.

Reference books:

1. Procedural elements of Computer Graphics, David F. Rogers, Tata McGraw Hill.
2. Computer Graphics, Donald Hearn, M P. Baker, PHI.
3. Computer Graphics: A programming Approach, Steven Harrington, McGraw-Hill.
4. Techmax publication book
5. Computer Graphics: A programming Approach, Steven Harrington, McGraw-Hill.
6. Theory and Problems of Computer Graphics, Zhigang Xiang, Roy, plastock, Schaum‟s outline series, McGraw-Hill.

Access to the Course

The course is available for all the students admitted for Bachelor of Science.

Methods of Assessment

The assessment pattern would be 60:40, 60% for Semester End Examination (SEE) and 40% for Continuous Internal Assessment (CIA). The structure of the SEE and CIA would be as recommended by the Board of Studies and approved by the Board of Examination and the Academic Council of the college.

Pattern of Evaluation

The Examination/Evaluation pattern shall be framed by the Board of Examination with its final approval from the Academic Council of the College.